

**THE LEARNING STYLES AND ACHIEVEMENT OF STUDENTS IN
SCIENCE USING VISUAL, AUDITORY AND KINESTHETIC (VAK)
MODALITY.**

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UNIVERSITI TEKNOLOGI MALAYSIA

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**A project report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Education (Educational Psychology)**

**FACULTY OF EDUCATION
UNIVERSITI TEKNOLOGI MALAYSIA**

NOVEMBER 2010

DEDICATION

To my beloved mother Madam Vanajah and father Mr Mamickam
for all their sacrifices and support

ACKNOWLEDGEMENT

I wish to express my sincere appreciation to my supervisor Dr Nooraini Othman for her valuable advice, helpful suggestions and guidance from the start of this project paper until I was able to complete it. Thank you for being understanding, considerate and patient.

I would also like to express my gratitude to the principal of SMK Taman Johor Jaya 2 for giving me the permission to carry out the study in the school. I'm also thankful to the teachers and Form 3 students for helping me to complete my questionnaire.

Finally, my appreciation is to my parents whose support and sacrifices has inspired me to achieve greater heights. I'm grateful to my fellow friends who helped me in giving ideas, sharing knowledge and providing moral support for me.

ABSTRACT

Learning Style is one of the main factors that influence student's academic achievement. The purpose of this study was to identify the style of learning among Form 3 students of Sekolah Menengah Kebangsaan Taman Johor Jaya 2, Johor Bahru and evaluate whether there is a correlation between the learning styles of Form 3 students with their Science achievement. Besides investigating the relationship between learning styles and achievement, the difference in learning style, race and gender are also investigated. The instrument used in the research was modified from "Learning Style Questionnaire" by Diane Johnson (2004) and translated to Bahasa Melayu. This instrument consists of 30 items that can be categorized into 3 modalities as visual, auditory and kinesthetic. The survey was carried out by distributing questionnaire to 50 Form 3 students from Sekolah Menengah Kebangsaan Taman Johor Jaya 2, Johor Bahru. Data was analyzed statistically by using Package SPSS Version 12.0. The outcome of the study indicates that the pupils of Sekolah Menengah Kebangsaan Taman Johor Jaya 2, Johor Bahru have certain difference in their learning style based on race and gender. They prefer to learn using a combination of three modalities. Besides that, it is also found that this students practise learning style base on a single modality that is visual, auditory or kinesthetic, a combination of two modalities and combination of three modalities. A positive and significant correlation had been found between the Science achievement with the single modality or a combination of two modalities. This research failed to reject that there is any significant correlation between the pupils practising combination of three modalities with Science achievement.

ABSTRAK

Gaya pembelajaran merupakan salah satu faktor penting yang mempengaruhi pencapaian akademik pelajar. Tujuan kajian ini adalah untuk mengenal pasti gaya pembelajaran di kalangan pelajar-pelajar Tingkatan 3 di Sekolah Menengah Taman Johor Jaya 2, Johor Bahru serta hubungan di antara gaya pembelajaran dengan pencapaian Sains mereka. Selain mengkaji hubungan di antara gaya pembelajaran dengan pencapaian Sains, perbezaan di dalam gaya pembelajaran mengikut budaya dan jantina juga dikaji. Instrumen yang digunakan ialah borang soal selidik yang telah diambil daripada "Learning Style Questionnaire" oleh Diane Johnson (2004) dan diterjemahkan ke dalam Bahasa Melayu. Instrumen ini mengandungi 30 item yang di kategorikan kepada 3 modaliti iaitu modaliti visual, modaliti auditori dan modaliti kinestetik. Kajian ini menggunakan kaedah tinjauan melibatkan 50 orang pelajar Tingkatan 3 dari Sekolah Menengah Taman Johor Jaya 2. Data dianalisis dengan menggunakan Pakej Statistik Untuk Sains Sosial (SPSS Versi 12.0). Hasil analisis menunjukkan pelajar-pelajar Tingkatan 3 pelajar Tingkatan 3 dari Sekolah Menengah Taman Johor Jaya 2 menunjukkan terdapat perbezaan dari segi budaya dan jantina. Selain itu, pelajar-pelajar ini juga mengamalkan gaya pembelajaran mengikut satu modaliti iaitu visual, auditori atau kinestetik, gabungan dua modaliti dan gabungan tiga modaliti. Hubungan positif yang kuat dan signifikan di antara gaya pembelajaran satu modaliti dan gabungan dua modaliti dengan pencapaian Sains. Kajian ini gagal menunjukkan terdapatnya sebarang hubungan yang signifikan di antara pengamal gabungan tiga modaliti dengan pencapaian Sains.

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LIST OF SYMBOLS

VAK – Visual, auditory and Kinesthetic

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CHAPTER 1

INTRODUCTION

1.1 Introduction of Research

Each students interpret information in different ways. The way each individual process the information they received in their preferred way is known as learning styles. Since Science is a subject that comprises of facts, most of the students find it as hard to memorise or understand the concept. This may make these students lose their interest for the subject. So, to understand the concept better, these students must their preferred learning style. When the students learn using their best way, they can yield better outcomes.

In order to make the students learn better , the teacher plays an important role to modify their teaching methods according to students preference. When students are interested to learn the subject, this can avoid certain problems such as lack of motivation, dropouts, failures, disinterest of students in particular subject, IQ problems, and examination phobia among students. So, as a teacher, they also need guidance and feedback to identify their students interest. It is important for teacher's to identify each of their students need so that they can adapt their teaching to students need. There are a lot models created to identify a students learning style. In this research, VAK Modality are used to identify students learning style. The learning

styles are also influenced by other external factors such as culture and gender. In this research, these two factors are also observed. It is hoped that this research can contribute new solutions to solve problems in teaching and learning process.

1.2 Background of Research

In this science and technology era, Science subject plays an important role towards the development and building of our country. In addition, Science is essential in telecommunication purpose. According to Ministry of Education (2004), Science syllabus was designed to give opportunities to students to get knowledge and experience in decision making and problem solving.

According to Dunn (1989), students couldn't master fully in Science because it is influenced by the learning style of the student and teacher's teaching. So, when students use different learning styles, their achievement will get better. According to Wong (2000), students tend to find it difficult to learn when their learning styles does not match the teacher's teaching. Besides that, some students does not realize that their learning style is different than other students.

Each of us has different way to perceive the information and process in the different way. Our learning styles are also different. Some of the factors which contribute to the preference of our learning styles are genetically and the environment that we were growing since young. Once we had discovered our preferred learning styles, we can use it in our teaching and learning process to increase the effectiveness of information processing.

Learning styles are the best way chosen by an individual to learn best in the classroom. Most of us have certain method that we favor to process certain stimuli or information. So, teachers are the one who plays an important role in this process. They should assess the learning styles of their students and adapt their classroom methods to best fit each student's learning styles. When teacher manage to identify

their students learning styles, they can prepare classes according to students learning styles. Students can also use the model to identify their learning style and use these styles to process the information cognitively.

One way to identify these learning styles is by using VAK (Visual, Auditory and Kinesthetic) modality. By using this modality, teacher can identify their student's problem and will modify their teaching style to suit student's interest. When students had identified their learning style, they will try to integrate it in the classroom. This could reduce disinterest of the subject among students. Besides that, when students use their preferred style to perceive knowledge, they might be able to learn better and this might increase their achievement in the subject.

1.3 Statement of Problem

Science is a subject that is complex and needs certain strategy or special method to master it. Science is normally related with high learning techniques. The contents are in orderly manner and involves higher thinking levels. In order to master it, students need to think in analitical, rational and logical way so that they can solve the problems easily.

Mamchur (1984), adds that teachers should identify their student's learning style and prepare different types of assessment which involves different learning styles. When students carry out activities which suits their learning styles, this can increase their achievement in Science and finally they will have confidence in themselves.

Generally, if we look at students result, they can get good result. But, there are still some students who could not do well and get bad result. This study is to see the impact of different learning styles using visual, auditory and kinesthetic (VAK) on students achievement in Science. Besides achievement, the learning styles of students are also influenced by the race and gender. Different race and gender perceive information in different manner. From this research the difference of race

and gender in Science using visual, auditory and kinesthetic (VAK) modality is also studied. .

1.4 Research Objectives

The objectives of the research are:

- i. To identify the learning styles of respondents using VAK modality in Science.
- ii. To identify the difference in learning styles among respondents based on races using VAK modality in Science.
- iii. To identify the difference in learning styles among respondents based on genders using VAK modality in Science subject.
- iv. To identify the relationship between the learning style and achievement in Science among the respondents.

1.5 Research Questions

- i. What are the learning styles of respondents using VAK modality in Science ?
- ii. What are the difference in learning styles among respondents based on races using VAK modality in Science ?
- iii. What are the difference in learning styles among respondents based on genders using VAK modality in Science ?
- iv. Is there any relationship between learning styles and achievement in Science among the respondents?

1.6 Research Hypothesis

Hypothesis had been created for the three research question. H_0 represents null hypothesis.

H_{01} : There is no significant relationship between learning styles and achievement in Science among respondents.

H_{02} : There is no significant difference in learning styles among respondents based on races.

H_{03} : There is no significant difference in learning styles among respondents based on genders.

1.7 Research Significance

In teaching and learning process, teachers play an important role to influence the learning style of students. An effective teaching process will increase the input on a student and they are able to remember the facts for a longer period. In addition, students can learn new skills to improve their learning process. But, not all of the students use the same learning styles. Some may learn better using diagrams and pictures and some prefer hands on activities. So, it is very important for the teacher to identify students with different learning styles and to guide them through the process.

Teachers should adapt with the students learning styles. They should use different approach, method and technique so that the objective in the classroom can be achieved. This fact is supported by Dunn (1989), that when students could follow teacher's teaching style, then the teacher should teach using students learning style. This means teacher should teach according to students different learning style so that the whole teaching and learning process can be achieved. Activities which suits their learning styles can increase their confidence to learn. Students will be enjoying the whole teaching and learning process. In addition, a student can improve their self confidence and polish up their capabilities. This can create a

meaningful learning process. So, it is very important for a teacher to identify students learning styles and use a variety of activities that suits well their learning style.

Learning styles can benefit students, educators and parents. When students had identified their learning style, they can change the way they perceive the information. When they discovered it, they can learn and perform their best way. Besides that, it can also boost their confidence. In addition, when the environment is supportive, they will feel themselves as special and will get self respect. This will promote a better understanding between the students and others. Furthermore, when they had identified their learning style, they will try to perform better and this might increase their achievement in certain subject.

As for educators, when they can identify these learning styles in their students, they can have the power to design interesting activities that can suit the students interest. This could create an interesting and motivating environment in the classroom. They can increase students achievement in the subjects by changing their method of teaching. Educators can also increase their professionalism and communication skills by discussing this learning styles with other educators. This can also build their working skills.

As for parents, the knowledge of learning styles can help them by providing their children with the materials that suit their children's learning style. Besides that, parents can talk and have meaningful conversation about their children's learning style with the educators in order to increase their children's achievement in school. Parents can provide an environment that is supportive for their children's studying at home.

1.8 Research Scope

This research is conducted on 50 Form 3 students for Science subject in SMK Taman Johor Jaya 2, Johor. The achievement for Science subject is obtained from

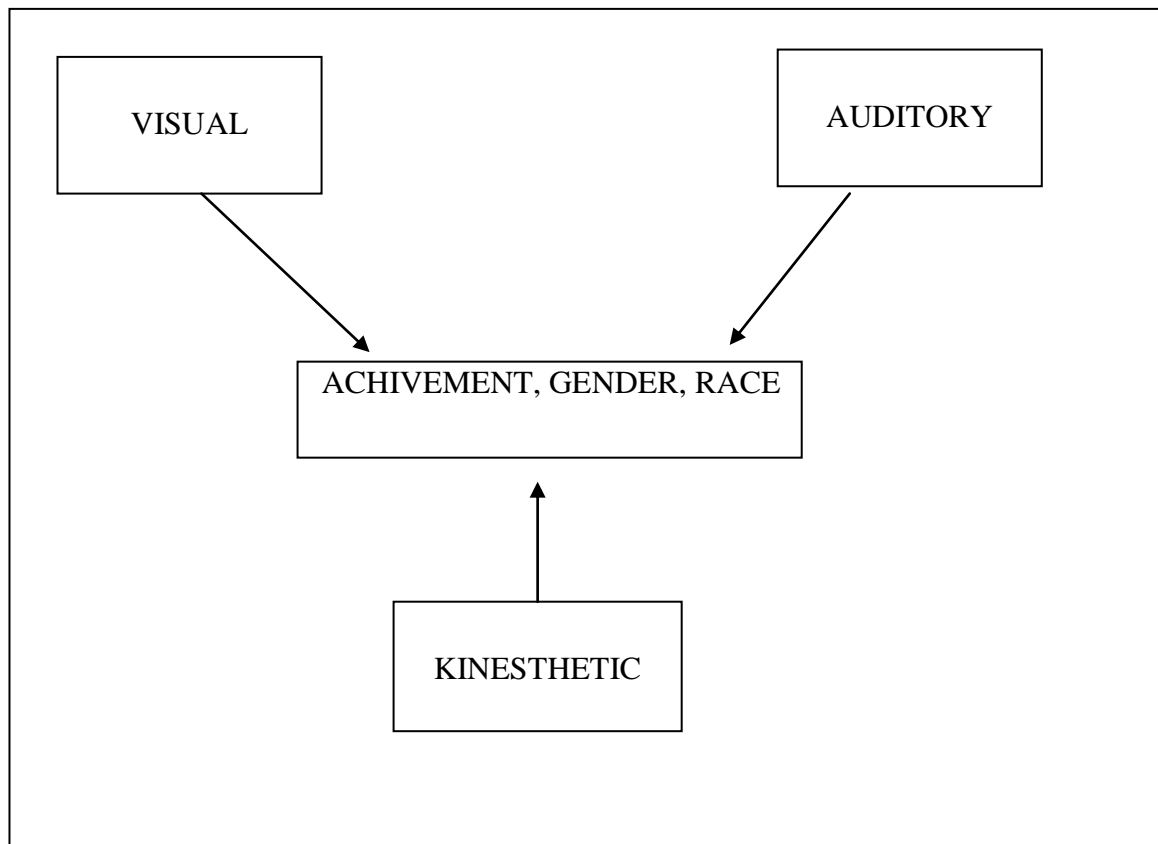
their last year's final examination result which was on 2009. It will be in marks form. There are no pre or post test for this research. The learning style that is studied is based on VAK modality. Besides that, the difference of learning styles in race and gender are also observed.

1.9 Conceptual Framework

The concept used in this research is from Fleming's VAK Model. VAK stands for visual, auditory and kinesthetic learning styles. In this research, these three learning styles are used to study the students achievement in Science. Besides that, gender and race are also studied. Visual learning styles are individuals who used sight as the highest tendency to perceive information, auditory are those who use hearing as the main way to perceive information and kinesthetic learners are those prefers to use hands on activity to perceive information.

The aim is to study whether this learning styles can increse students achievement in Science. Besides that, gender and race factor are also studied to see the impact of learning styles in race and gender.

Table 1.1
Conceptual Framework



1.10 Definition of Terms

1.10.1 Learning Style

According to Oxford Dictionary, learning means knowledge or skills acquired through study or by being taught and style means A manner of doing something DePorter *et al.* (1992) , learning style refers to the way someone receive and use the information they get using their own learning style. They added that learning styles can be divided to 2 categories which is perception towards the information and ways to organize and process an information. Learning style is a combination of an individual's modality and the way to organize and process an information.

1.10.2 Achievement

According to Hawkins (1991) in Oxford Dictionary, achievement means accomplishment and success. This is obtained from an examination. Highest score is for marks between 80 and 100. This is categorized under excellent group. 60 to 79 is under average group. 40 and 59 is under pass groups and marks below 40 is considered fail.

1.10.3 Student

Individuals learning in schools or higher learning institutions.

1.10.4 Visual, Auditory And Kinesthetic (VAK Modality)

According to Hawkins (1991) in Oxford Dictionary, modality means relating to mode or form as opposed to a substance. One of the most commonly used learning styles is Fleming's (1995) VAK model. It can be divided to:

1. visual learners;
2. auditory learners
3. kinesthetic learners or tactile learners.

This model is used in the classroom to identify student's learning style in a specific area.

1.10.5 Conceptual Definition

In the concept, learning styles are different methods students use in their learning process in order to receive the information better. Most of us are aware that each individual prefer different learning styles and techniques. Some people may find a dominant style to perceive information. Others may find the usage of a combination of styles is more dominant. What is important is our styles are not fixed. Our learning styles might change depending to the situation or environment we are learning. Besides that, one should know that we can use any learning styles in order to receive the information effectively. We should not restrict or put a barrier on any learning styles. We can use it fully as long as we are convenient with it.

Our learning styles can influence us in our learning process. Our preferred styles guide the way we learn. Besides getting the information, these styles can also change the way how we recall information and apply this information in our daily life. In addition, it can change the way we interpret information. If we look at our education system, many schools still use ‘chalk and talk’ teaching, a lot of repetition, pressured exams for reinforcement and review. As a result of this is that we often label those who use these learning styles and techniques as “bright.” Those who use less favored learning styles often find themselves in lower classes; negative labels sometimes lower quality teaching. This can create a belief among individuals that they are “smart” or “dumb.” This way is not appropriate.

We can just label individuals by this method. It is unfair because each of us have our own ability. It is the teacher’s duty to identify these abilities and polish them. By recognizing students learning styles through VAK Modality, teachers can use techniques that suit the students. This improves the quality of teaching and learning process.

1.11 Conclusion

The important aspects of this study are mentioned. The researcher had stated and discussed the background of the study. The usage of different methods to teach students in the school has led the writer to take up this study. The significance and aim of this study is also mentioned. Besides these, the researcher also gave a brief account for the definition of title and the conceptual framework.

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APPENDIX A

The logo consists of the words "SOAL SELIDIK" in a bold, black, sans-serif font, centered within a white oval. The oval has a thin black border and a subtle grey drop shadow to its right.

SOAL SELIDIK

BAHAGIAN A

Ini adalah satu soal selidik untuk mengumpul maklumat berkenaan gaya pembelajaran anda. Sila jawab semua soalan dengan tepat dan jujur. Segala kenyataan adalah sulit dan akan diproses oleh penyelidik secara individu. Kerjasama anda saya dahului dengan ucapan terima kasih.

Inventori Latar Belakang Pelajar Tingkatan 3 S.M.K TAMAN JOHOR JAYA 2

1. Jantina : Lelaki / Perempuan
2. Bangsa : Melayu / Cina / India
3. Keputusan mata pelajaran **Sains**:
Peperiksaan Akhir Tahun 2009

Markah:

BAHAGIAN B
Kaji Selidik Gaya Pembelajaran

Sila jawab: 3 markah jika item itu kerap diamalkan.
2 markah jika item itu kadang-kadang diamalkan.
1 markah jika item itu jarang diamalkan.

Adakah anda seorang pelajar yang mengamalkan gaya pembelajaran Auditori?

1 2 3

1.	Saya belajar dengan berkesan secara kuliah dan paling teruk jika gunakan papan tulis dan kapur dan juga buku teks.			
2.	Saya benci mengambil nota; saya lebih gemar mendengar kuliah.			
3.	Saya menghadapi masalah mengikuti penyelesaian masalah secara bertulis di papan tulis, kecuali setiap langkah yang tertera diberi penerangan secara lisan oleh cikgu.			
4.	Saya dapat ingat dengan lebih baik apa yang diterangkan kepada saya daripada apa yang saya perhatikan dengan mata sendiri.			
5.	Saya lebih cepat memahami Sains jika ianya diterangkan dengan lebih kerap.			
6.	Saya tidak suka membaca penerangan yang diberikan dalam buku Sains; saya lebih suka jika konsep baru itu diterangkan kepada saya oleh seseorang.			
7.	Saya cepat letih apabila membaca Sains, walaupun penglihatan saya adalah baik.			
8.	Saya berharap guru Sains saya akan memberikan lebih banyak penerangan secara lisan daripada menulis di papan tulis.			
9.	Saya mengulang fakta-fakta dalam minda apabila menyelesaikan masalah Sains secara mental.			
10.	Saya dapat menyelesaikan sesuatu masalah Sains dengan lebih berkesan jika saya mengulangi secara senyap masalah Sains tersebut dalam minda semasa cuba menyelesaikannya.			

JUMLAH SKOR UNTUK PEMBELAJARAN SECARA AUDITORI

Adakah anda seorang pelajar yang mengamalkan gaya pembelajaran Visual?

		1	2	3
1.	Saya dapat ingat Sains dengan lebih berkesan jika saya mencatatkannya.			
2.	Saya lebih suka belajar Sains di tempat yang sunyi.			
3.	Saya dapati susah untuk memahami Sains jika seseorang hanya menerangkannya secara lisan tanpa menulis cara penyelesaiannya di papan tulis.			
4.	Ianya dapat membantu jika saya dapat menggambarkan cara menyelesaikan sesuatu masalah Sains dalam minda.			
5.	Saya suka mencatat seberapa banyak yang boleh dalam Sains.			
6.	Saya mesti mencatatkan semua cara penyelesaian bagi Sains supaya dapat mengingatnya.			
7.	Apabila mengambil ujian Sains, saya selalu dapat mengimbas kembali mukasurat dalam nota atau buku teks yang mempunyai penerangan tentang cara penyelesaian masalah atau jawapan tersebut.			
8.	Konsentrasi saya senang terganggu atau saya akan menghadapi masalah memahami di kelas Sains jika terdapat sebarang pergerakan atau bunyi yang tidak diingini.			
9.	Memerhatikan guru Sains saya apabila beliau mengajar menolong saya memfokus.			
10.	Jika saya disuruh menyelesaikan masalah Sains, saya terpaksa membayangkannya dalam minda saya terlebih dahulu untuk mengetahui apakah yang dikehendaki oleh soalan tersebut.			

JUMLAH SKOR UNTUK PEMBELAJARAN SECARA VISUAL

Adakah anda seorang pelajar yang mengamalkan gaya pembelajaran Kinestetik?

1 2 3

1.	Saya dapat mempelajari Sains dengan paling berkesan apabila saya hanya masuk ke dalam kelas dan melakukan sesuatu dengan tangan saya.			
2.	Saya belajar Sains dengan lebih berkesan apabila saya dapat bergerak, mengubah-ubah tempat pembelajaran atau menghayun.			
3.	Saya pelajari Sains dengan lebih berkesan apabila saya dapat memanupulasinya, menyentuhnya atau menggunakan contoh jenis "hands-on".			
4.	Biasanya saya tidak dapat menerangkan secara lisan cara saya menyelesaikan sesuatu masalah Sains.			
5.	Saya tidak boleh hanya ditunjukkan cara menyelesaikan sesuatu masalah Sains; saya mesti cuba menyelesaikannya sendiri supaya saya mempelajarinya.			
6.	Saya selalu suka menggunakan jari atau apa-apa sahaja yang boleh dimanipulasikan untuk membayangkan Sains.			
7.	Saya kerap berehat dan bergerak kesana sini apabila belajar Sains.			
8.	Saya lebih suka mengikut gerak hati semasa menyelesaikan masalah Sains, untuk merasai atau menghayati apa yang betul.			
9.	Saya gemar menyelesaikan permainan Sains atau teka silang kata semasa saya mempelajari Sains.			

10.	Saya dapat belajar Sains dengan paling berkesan jika saya dapat mengamalkannya dalam kehidupan harian.			
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JUMLAH SKOR UNTUK PEMBELAJARAN SECARA KINESTETIK

Saluran pembelajaran persepsi saya yang dominan ialah:

(masukkan kategori yang mengkecapi jumlah skor tertinggi)

Saluran pembelajaran persepsi saya yang sekunder ialah:

(masukkan kategori yang mengkecapi jumlah skor kedua tinggi)

Saluran pembelajaran persepsi saya yang tertiar ialah:

(masukkan kategori yang mengkecapi jumlah skor yang ketiga tinggi)

(Untuk diisi oleh Penyelidik)

Gaya Pembelajaran Mengikut Modaliti VAK

Gaya Pembelajaran	Skor

LAMPIRAN B

Learning Styles Questionnaire

Please answer: 3 points if the item usually applies.
 2 points if the item sometimes applies.
 1 point if it rarely applies.

Are You an Auditory Learner?

- _____ 1. I learn best from lecture and worst from the chalkboard or the textbook.
- _____ 2. I hate taking notes; I prefer just to listen to lectures.
- _____ 3. I have difficulty following written solutions on the chalkboard,
 unless the teacher verbally explains all the steps.
- _____ 4. I can remember more of what is said to me than what I see with my eyes.
- _____ 5. The more people explain Science to me, the faster I learn it.
- _____ 6. I don't like reading explanations in my Science book; I'd rather have
 someone explain the new material to me.
- _____ 7. I tire easily when reading Science, though my eyes are okay.
- _____ 8. I wish my Science teachers would lecture more and write less on the
 chalkboard.
- _____ 9. I repeat the numbers to myself when mentally working out Science
 problems.
- _____ 10. I can work Science problem out more easily if I talk myself through the
 problem as I solve it.

_____ **TOTAL SCORE FOR AUDITORY LEARNING**

Are You a Visual Learner?

- _____ 1. I am more likely to remember Science if I write it down.
- _____ 2. I prefer to study Science in a quiet place.
- _____ 3. It's hard for me to understand Science when someone explains it
 without writing it down.
- _____ 4. It helps when I can picture working a problem out in my mind.
- _____ 5. I enjoy writing down as much as I can in Science.
- _____ 6. I need to write down all the solutions and formulas in order to
 remember them.
- _____ 7. When taking a Science test, I can often see in my mind the page in my
 notes or in the text where the explanations or answers are located.
- _____ 8. I get easily distracted or have difficulty understanding in Science class
 when there is unnecessary movement or noise.
- _____ 9. Looking at my Science teacher when he or she is lecturing helps me to
 stay focused.
- _____ 10. If I'm asked to do a Science problem, I have to see it in my mind's eye
 to understand what is being asked of me.

_____ **TOTAL SCORE FOR VISUAL LEARNING**

Are You a Kinesthetic/Tactile Learner?

- _____ 1. I learn best in Science when I just get in and do something with my hands.
- _____ 2. I learn and study Science better when I can pace the floor, shift positions a lot, or rock.
- _____ 3. I learn Science best when I can manipulate it, touch it, or use hands-on examples.
- _____ 4. I usually can't verbally explain how I solved a Science problem.
- _____ 5. I can't just be shown how to do a Science problem; I must do it myself so I can learn.
- _____ 6. I've always liked using my fingers and anything else I could manipulate to figure out my Science.
- _____ 7. I need to take lots of breaks and move around when I study Science.
- _____ 8. I prefer to use my intuition to solve Science problems, to feel or sense what's right.
- _____ 9. I enjoy figuring out Science games or puzzles when I learn Science.
- _____ 10. I learn Science best if I can practice it in real-life experiences.

_____ **TOTAL SCORE FOR KINESTHETIC LEARNING**

My dominant perceptual learning channel is:

(enter the category with the highest total score)

My secondary perceptual learning channel is:

(enter the category with the second highest total score)

My tertiary perceptual learning channel is:

(enter the category with the third highest score)

Learning Styles	Score